The second part of 2016 shows snow anomalies in the permafrost region and extended vegetation anomalies:

- High vegetation greenness observed in Italy during the whole summer 2016.
- Melting of ice in Siberian lakes due to high temperatures anomalies in June 2016.

Anomalies of ice in Siberian lakes in June 2016 due to high temperatures:

Mild winter weather and temperatures anomalies in mid-June (Figure 1) probably caused the unusual absence of ice observed in several lakes of northern Russia in the Yamalia district in mid-June 2016 (in the black circle).

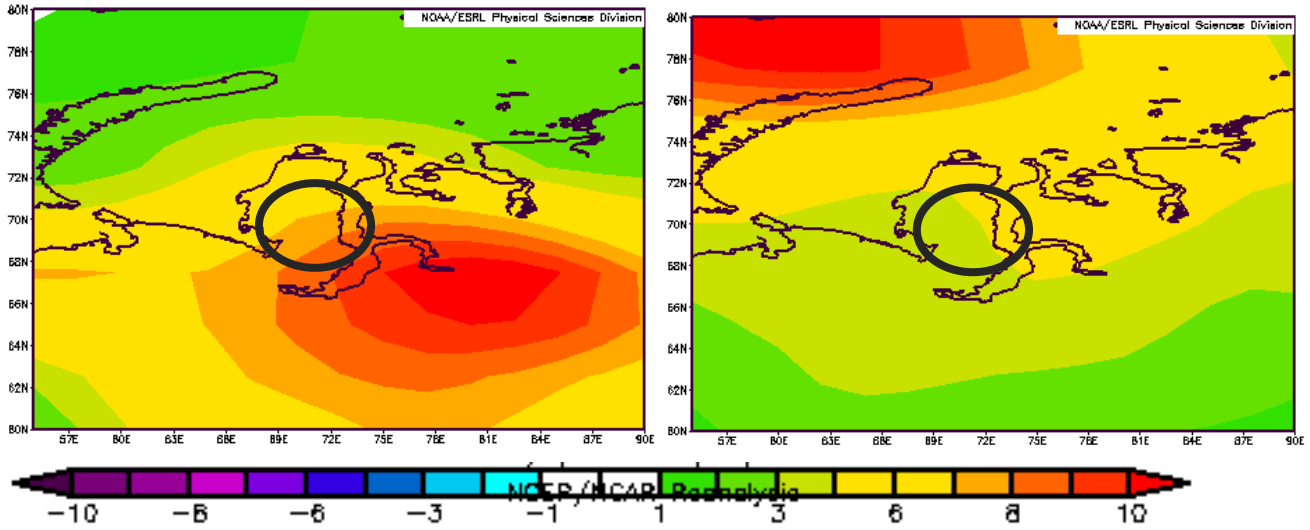


Figure 1: Surface air temperature anomalies in Northern Russia between the 1st and the 10th of June 2015 and 2016 (1981-2010 climatology). Source: NCER/NCAR reanalysis.

The absence of ice in june has been detected as an anomaly in June (Figure 2) because of the earlier than usual melt down. The same situation had already been observed in 2015 with even higher anomalies.

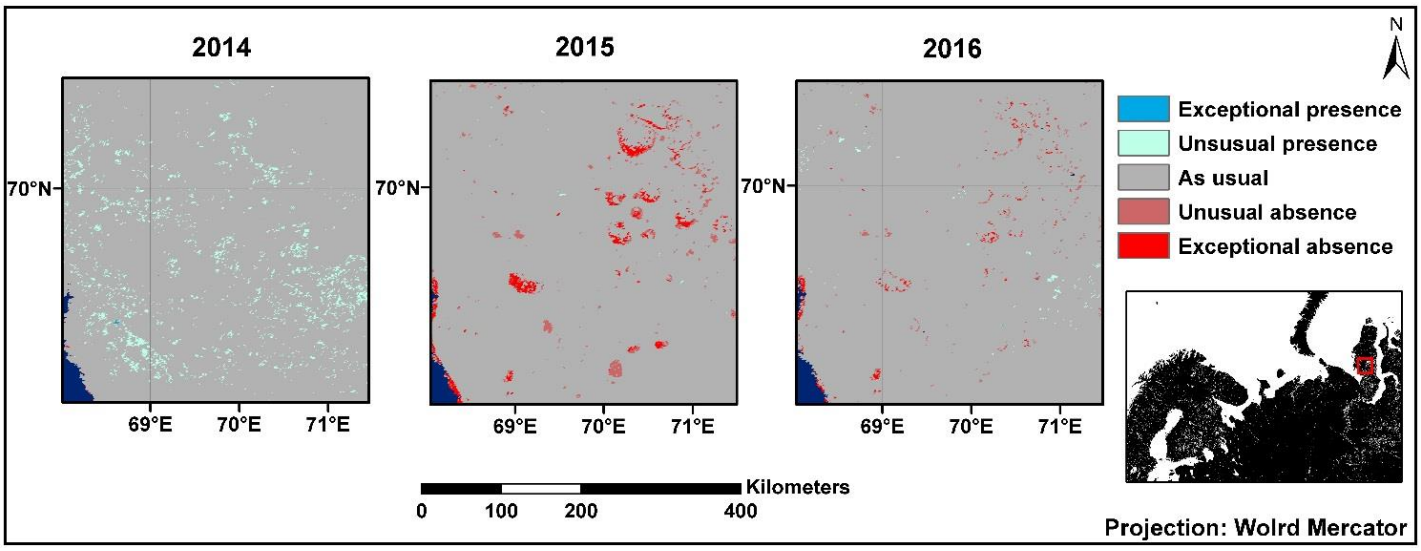


Figure 2: Snow anomalies in Northern Yamalia on the 10th of June 2014, 2015 and 2016.

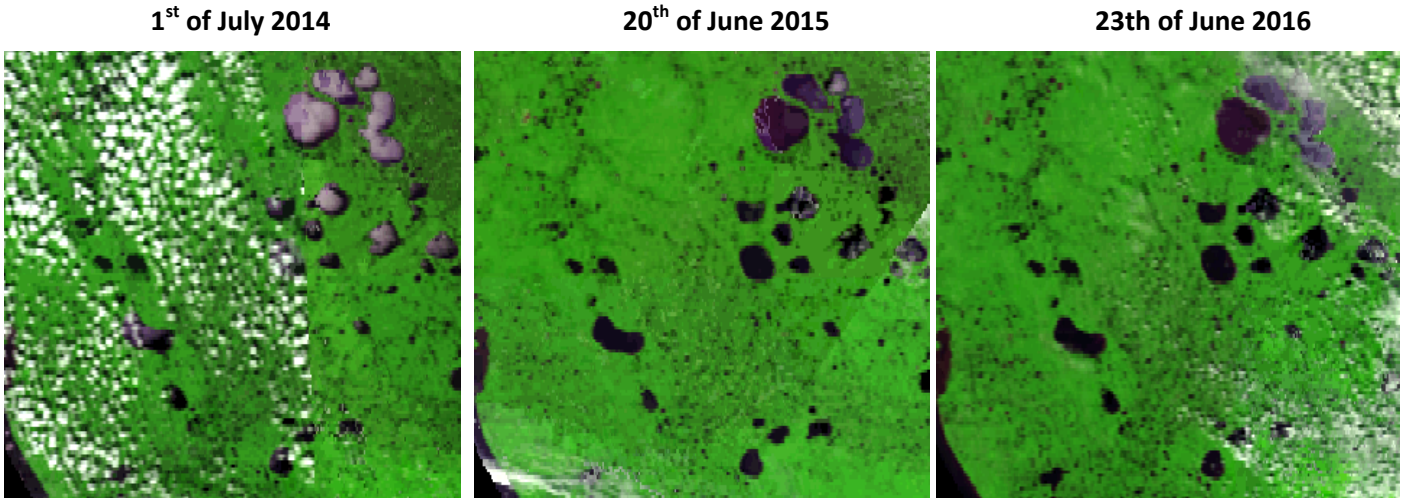
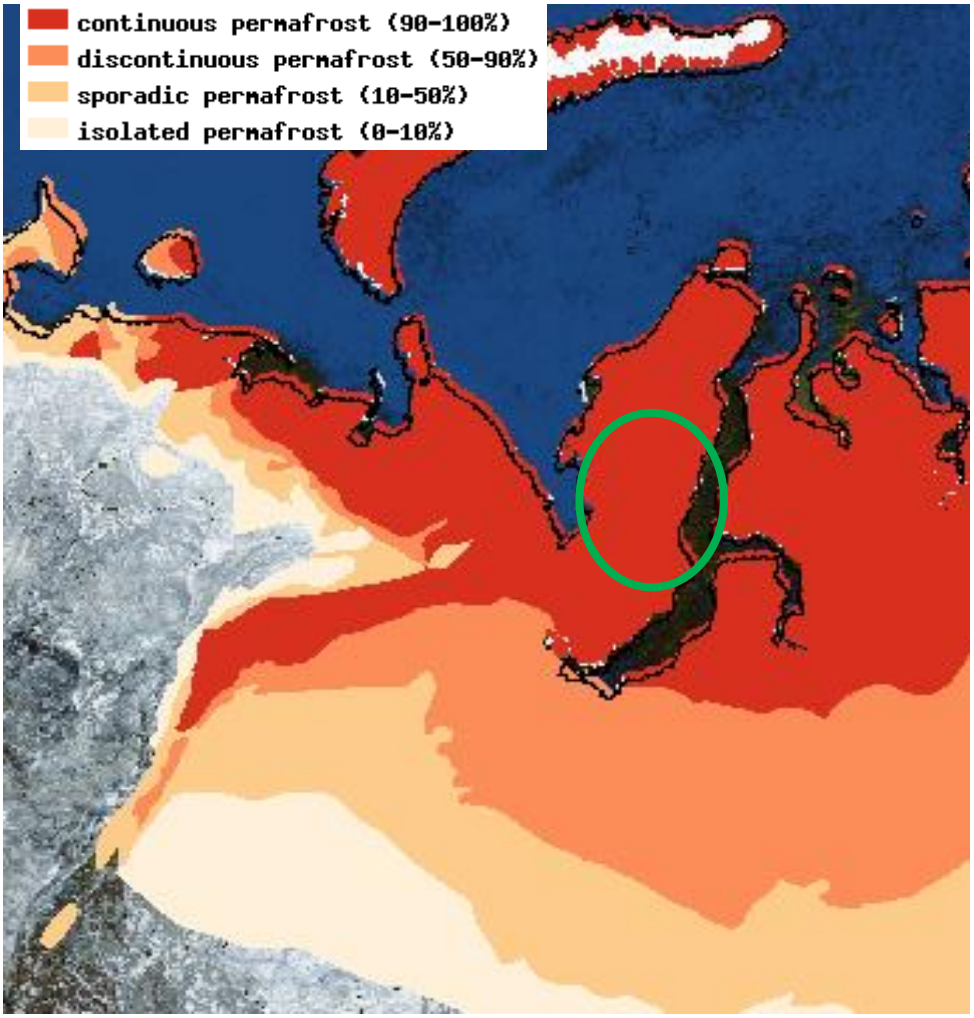


Figure 3: PROBA-V 1km images in Northern Yamalia in June 2014, 2015 and 2016. Water is black, ice is greyish.

Figure 3 shows colour images from PROBA-V images on the region in 2014,2015 and 2016. The extent of ice (white-purple hue) can be observed at these dates. As compared to 2014, which is a normal year (as seen on Figure 2), 2015 and 2016 have a smaller extent of ice even if the date of the image in 2014 has been taken later in the year than the two others.



This ice melting is of importance for the climate and thus for biodiversity. Indeed, this region is a part of the continuous permafrost region (Figure 4).

The early melting of ice in these lakes could be an indicator of early defrosting of soil and thus a higher defrosting of the permafrost in the summer season. We know that changes in the permafrost temperature is responsible for higher methane emissions which is a greenhouse gas (T. R. Christensen et al., 2004).

Figure 4: Permafrost extent and types around the region of interest (green circle). This map comes from NSIDC site, Atlas of the cryosphere, supported by NASA's EOS, Author: John Maurer.

Exceptional vegetation in Italy during the whole summer and a part of the autumn 2016.

From late June to the end of October 2016, higher than usual vegetation greenness has been observed over large part of italy and the dinaric alps. The extent and strength of anomalies were particularly large during all this period. Observed NDVI values were above the upper limit of the 95% confidence interval over large areas (Figure 5).

The high vegetation index values (NDVI) values are likely due to a persitant anomaly of precipitation in the whole region. Indeed, mean precipitations from early May to Early october were above the mean climatology (1981-2010) in the region (Figure 6).

Vegetation anomalies in the second half of 2016 were exceptionally extented and strong like in the first half of the year. In addition to Italy, anomalies happened in Turkey, Greece, Denmark, Poland, Germany, Spain, etc. The calibration of the new sensor that provides the original images could however also exaggerate the anomalies, which is being investigated.

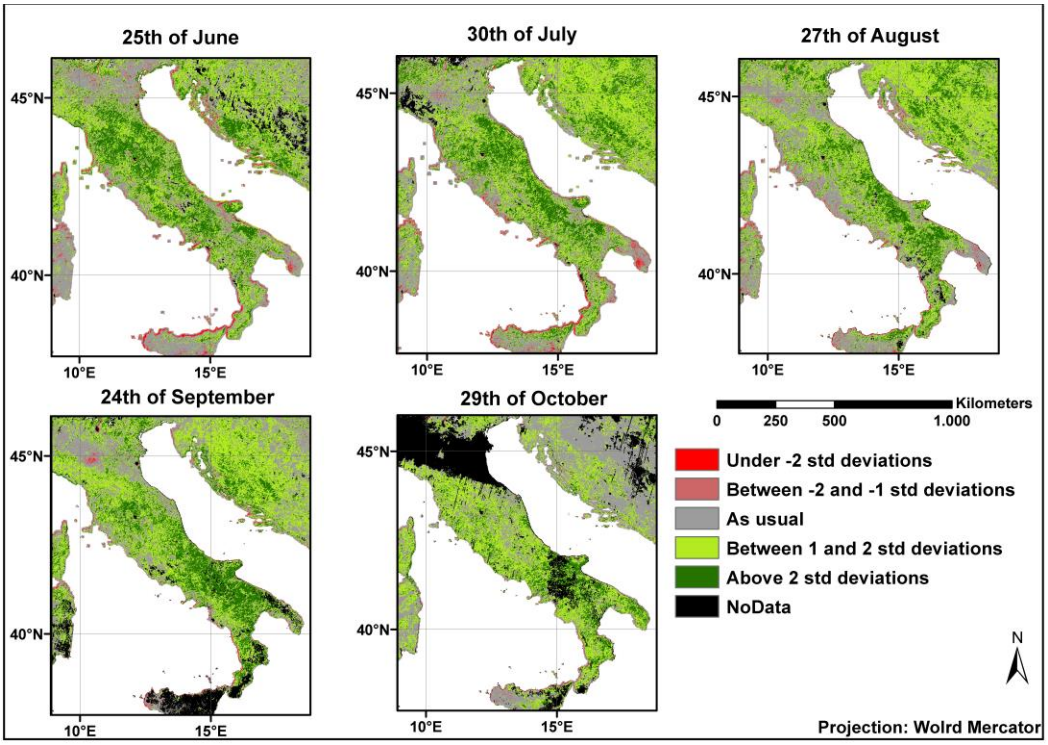


Figure 5: Vegetation anomalies in Italy during June, July, August, September and October 2016.

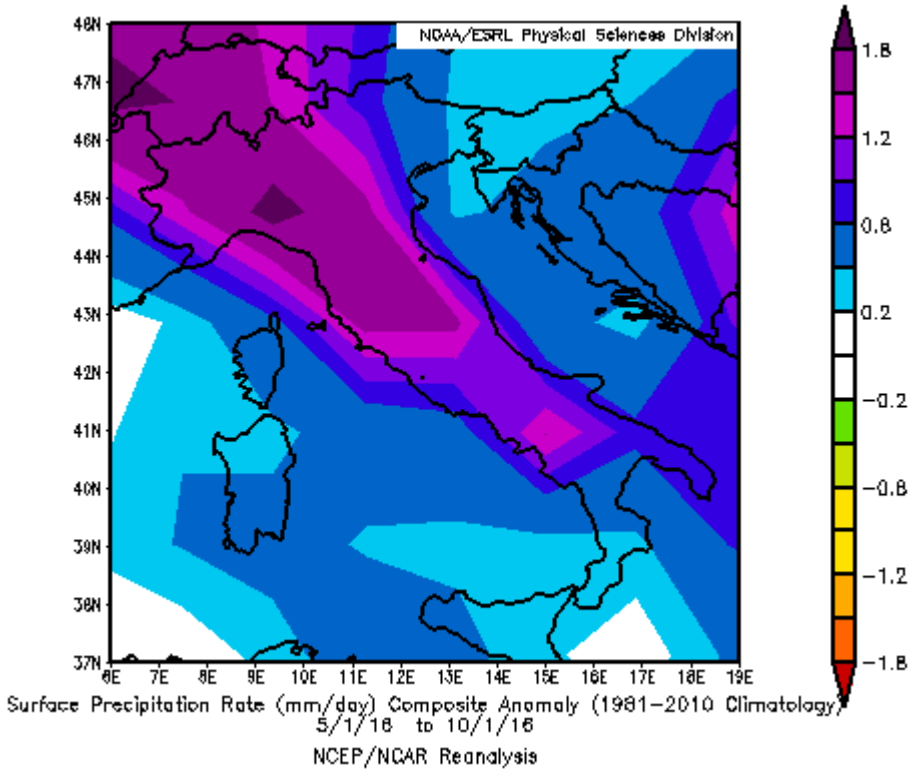
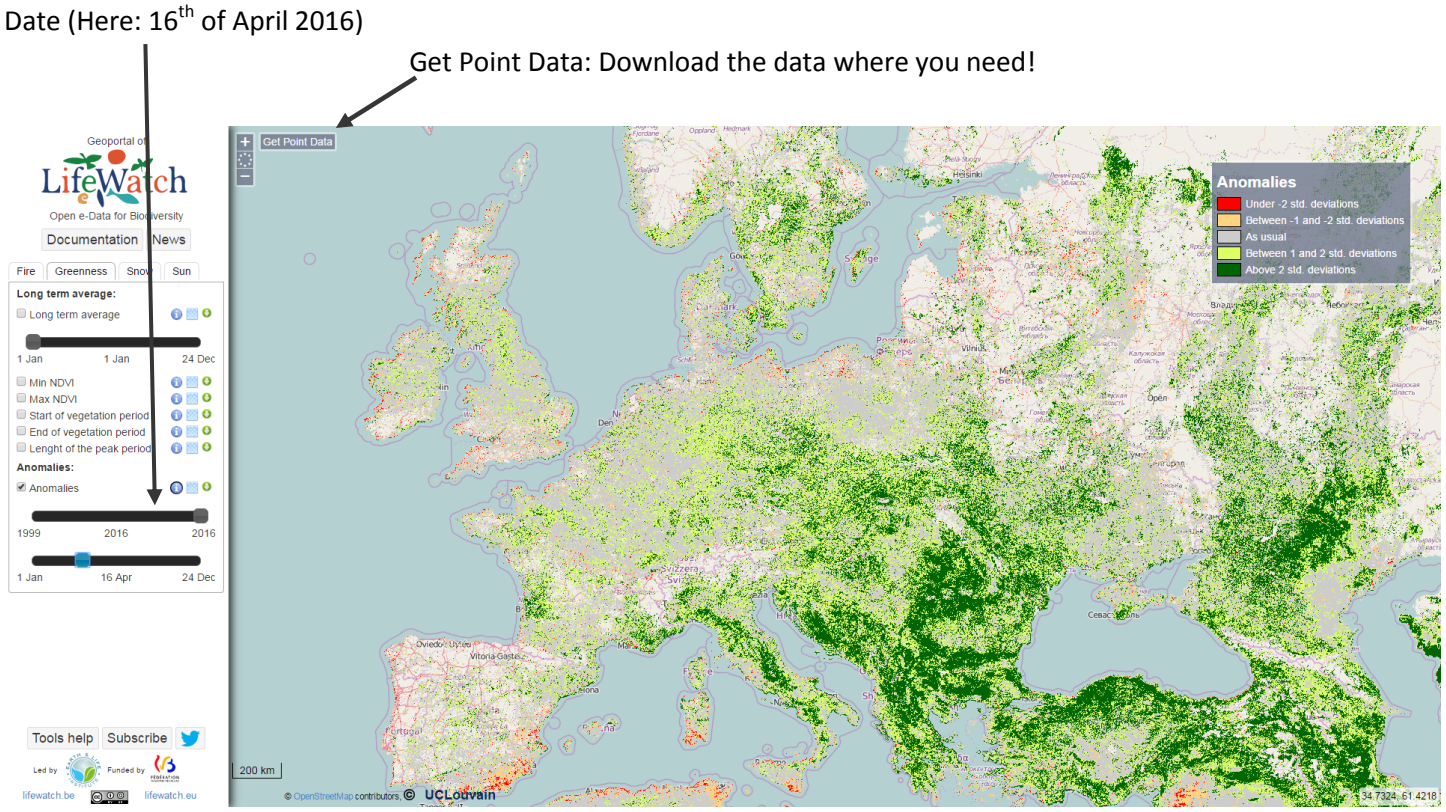


Figure 6: Precipitation anomaly between the 01/05/2016 and the 01/10/2016 in Italy. This figure comes from the NCEP/NCAR Reanalysis 1981-2010 Climatology.

Web portal to view and download data

All this information (and more) can be visualized from the web portal where a point based and a raster (.tif) extraction tools are provided (see below): *www.uclouvain.be/lifewatch*. All data are available at least from 2001 to present and are regularly updated. Follow us on Twitter to get the latest news @LifeWatch_WB. For comments, suggestions or unusual data request, contact us at *lifewatch@uclouvain.be*



LifeWatch: Biodiversity and Ecosystem research

LifeWatch Wallonia-Brussels is one of the Belgian contributions to the European Research Infrastructure Consortium for Biodiversity and Ecosystem research (LifeWatch). It is funded by the Fédération Wallonie-Bruxelles. Information about the Belgian contributions to LifeWatch can be found on *www.lifewatch.be*

Lifewatch is one of the most ambitious European initiatives for the study of biodiversity and ecosystems. LifeWatch is not a research project, but an infrastructure that offers services and tools to the scientific community, the policy makers and the public. In addition, LifeWatch will provide opportunities to construct personalized 'virtual labs', also allowing entering new data and analytical tools. More information about LifeWatch can be found on: *www.lifewatch.eu*

Methods

The summarized land surface dynamics are developed from remote sensing time series of daily global observations by satellites. The times series allow to derive average state of variables at any given time of the year. Data can be compared to this average to highlight anomalies. The average state of variables is developed within the CCI Land Cover project *http://www.esa-landcover-cci.org*. Metrics and anomalies are then derived in the frame of the Lifewatch-WB project. Data from the Belgian satellite Proba-V are used to continue the vegetation greenness time series after the end of SPOT-VEGETATION.